Special Session II

Special Session Basic Information:

专栏题目 **Session Title**	中文：多态系统可靠性与维修防御策略研究 英文：Reliability and Maintenance Defense Strategies for Multi-state Systems

专栏介绍和征稿主题
Introduction and topics

中文：工业系统向高度可重构、可扩展演进，多态系统的灵活适应性使其成为可靠性研究热点。然而，其形态切换时故障模式与失效机理的剧变，对传统可靠性建模、评估与维修策略构成新挑战。本专栏聚焦融合传统方法与 AI 技术的解决方案，汇集多态系统建模（含机理分析与智能建模）、评估与预测（结合传统模型与机器学习）、维修防御策略设计（含传统优化与自适应策略）等研究，旨在推动可靠性理论与智能技术的协同发展及工程应用。主题包括但不限于：1. 多态系统可靠性建模与失效机理分析；2. 多模式切换下的寿命预测与剩余寿命估计；3. 智能维修决策与防御策略优化；4. 基于数据驱动和机器学习的多态系统故障诊断；5. 多态系统的安全性与容错设计方法；6. 实际案例研究及工业应用实践。

英文：As industrial systems evolve towards high reconfigurability and scalability, multi-state systems have become a research hotspot in reliability due to their flexible adaptability. However, the drastic changes in failure modes and mechanisms during their state transitions pose new challenges to traditional reliability modeling, assessment, and maintenance strategies. This session focuses on solutions integrating traditional methods with AI technologies, gathering the latest research on modeling multi-state systems (including mechanism-based analysis and intelligent modeling), assessment and prediction (combining traditional models with machine learning), and maintenance/defense strategy design (encompassing traditional optimization and adaptive strategies). It aims to promote the synergistic advancement of reliability theory and intelligent technologies and their practical implementation. We warmly invite original contributions in (but not limited to) the following topics: 1. Reliability modeling and failure-mechanism analysis of multi-state systems; 2. Life-prediction and remaining useful life estimation under multi-mode transitions; 3. Intelligent maintenance decision-making and defense strategy optimization; 4. Data-driven and machine-learning approaches for fault diagnosis in multi-state systems; 5. Safety and fault-tolerance design methods for multi-state architectures; 6. Industrial case studies and practical applications.

Special Session Chair(s):

姓名 **Name**	彭锐 Rui Peng
称谓 **Prefix**	教授 Prof.
部门 **Department**	经济与管理学院 College of Economics and Management
单位 **Organization**	北京工业大学 Beijing University of Technology
城市/地区 **City/Region**	北京 Beijing

Organizer's Brief Biography

中文：北京工业大学教授、博士生导师。研究方向涵盖能源系统可靠性建模与优化、能源风险及能源政策。已发表SCI期刊论文140余篇，2018至2024年连续七年入选"爱思唯尔中国高被引学者"榜单。

英文： Professor and Ph.D. advisor at Beijing University of Technology. His research interests include reliability modeling and optimization of energy systems, energy risk, and energy policy. He has published over 140 SCI-indexed papers. From 2018 to 2024, he was selected for the Elsevier Highly Cited Chinese Researchers list for seven consecutive years.

姓名 Name	杨力 Li Yang
称谓 Prefix	教授 Prof.
部门 Department	可靠性与系统工程学院 School of Reliability and System Engineering
单位 Organization	北京航空航天大学 Beihang University
城市/地区 City/Region	北京 Beijing

Organizer's Brief Biography

中文：北京航空航天大学副教授，博士生导师。研究方向涵盖智能运维理论方法与应用、系统可靠性分析与风险评估等。发表论文100余篇，入选全球前2%顶尖科学家。

英文： Associate Professor and Ph.D. supervisor at Beihang University. His research focuses on AI-enhanced maintenance theory & applications, and system reliability analysis and risk assessment. With over 100 peer-reviewed publications, he has been recognized as a globally top 2% scientist.

姓名 Name	吴迪 Di Wu
称谓 Prefix	博士 Dr.
部门 Department	管理科学与工程学院 School of Management Science and Engineering
单位 Organization	中央财经大学 Central University of Finance and Economics
城市/地区 City/Region	北京 Beijing

Organizer's Brief Biography

中文：中央财经大学助理教授。研究方向涵盖系统可靠性评估与系统维修策略优化。发表SCI论文20余篇。

英文： Assistant Professor at the Central University of Finance and Economics. His research focuses on system reliability assessment and maintenance strategy optimization. He has published over 20 SCI-indexed papers.